

RESEARCH ARTICLE

Review of *Coeliaria* (Coleoptera: Coccinellidae: Chnoodini)

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<http://zoobank.org/500319E5-EFA3-4B84-8188-B8BE475B7D4A>

ABSTRACT. *Coeliaria* Mulsant, 1850 is revised based on the external morphology and genitalia of the adults and is distinguished from the other Chnoodini by the following characters: dorsal surface pubescent; antenna 11-segmented; hypomera with rounded fovea; tibia flat and angulated; abdominal postcoxal line incomplete, recurved and with oblique line. A new species, *Coeliaria castanea* **sp. nov.**, from Brazil, and two new combinations, are proposed: *Coeliaria bernardinensis* **comb. nov.** and *C. luteicornis* **comb. nov.**, expanding the distribution of the genus to Bolivia and Paraguay.

KEY WORDS. Coccinellinae, Neotropical Region, taxonomy.

INTRODUCTION

Coccinellidae Latreille, 1807 is an ecologically and morphologically diverse group of predators that are often used in biological control programs of insect pests (Hodek and Honěk 1996).

Since the establishment of Coccinellidae as a family, several authors have proposed classification systems for it. Beginning in the second half of the nineteen-century, Mulsant (1846, 1850) proposed a generic classification based on the pubescence patterns. He was followed Crotch (1874) and Chapuis (1876), who divided the family into “Aphidiphages” and “Phytophages”. Casey (1899) recognized 16 tribes, and other authors worked on an improved classification system for the family (Weise 1895, Sicard 1907, 1909). Korschefsky (1931, 1932), in his catalog, recognized three subfamilies and twenty tribes in Coccinellidae, whereas Bouchard et al. (2011) considered only two: Microweiseinae and Coccinellinae. In addition Bouchard et al. (2011) revalidated the name Chnoodini, which was accepted and followed by Seago et al. (2011), González (2013) and Krüger et al. (2016). Nedved and Kovář (2012), however, continued using the name Exoplectrini in their chapter on the phylogeny and classification of Coccinellidae, where they listed 20 genera for the tribe. Although the name Exoplectrini was used by Nedved and Kovář (2012) after the work of Bouchard et al. (2011) to name the tribe, Chnoodini is the correct name for the group, since it was first used by Mulsant (1850) as “Chnoodiens” (Principle of priority)

and later Latinized and used by Sicard (1909). Currently, in the Neotropical Region, Chnoodini includes *Chnoodes* Chevrolat, 1849, *Coeliaria* Mulsant, 1850, *Dapolia* Mulsant, 1850, *Dioria* Mulsant, 1850, *Exoplectra* Chevrolat, 1844, *Gordonita* González, 2013, *Incurvus* González, 2013, *Neorhizobius* Crotch, 1874, *Sidonis* Mulsant, 1850 and *Siola* Mulsant, 1850.

Mulsant (1850) described *Coeliaria* for *Exoplectra erythrogaster* Mulsant, 1850 based on the presence of “a deep fovea in the hypomera”.

Crotch (1874) briefly redescribed *Coeliaria* and indicated the presence of thoracic foveae and epipleura subfoveolate in *C. erythrogaster*. Chapuis (1876) treated *Coeliaria* as a subgenus of *Exoplectra*, indicating that the thoracic fovea of *C. erythrogaster* differs from the condition found in the other species of *Exoplectra*, which have a flat epipleura. Gemminger and Harold (1876), Korschefsky (1932) and Blackwelder (1945) listed *C. erythrogaster* in the monotypic genus, in their catalogs/checklist. Gordon (1994) and Fürsch (1990a,b) placed *Coeliaria* in Exoplectrini, and González (2013) recorded *C. erythrogaster* from Paraguay.

The Brazilian species of *Exoplectra* were reviewed by Costa et al. (2008), who provisionally removed *E. bernardinensis* and *E. luteicornis* from the genus.

In this paper, *Coeliaria* is revised based on its external morphology and genitalia. One new species from Brazil and two new combinations are proposed, expanding the size and distribution records of the genus.

MATERIAL AND METHODS

The specimens examined were provided by the California Academy of Sciences, California, USA (CAS); Coleção Entomológica Pe. J.S. Moure, Universidade Federal do Paraná, Curitiba, Paraná, Brazil (DZUP); Museu de Ciências Naturais, Fundação Zoobotânica, Rio Grande do Sul, Porto Alegre, Brazil (MCN); Muséum d'Histoire Naturelle de Lyon, France (MHNL); Museu Nacional do Rio de Janeiro, Rio de Janeiro, Brazil (MNRJ); Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZSP); United States National Collection, Smithsonian Institution, Washington, DC, USA (USNM); and the Zoological Museum, University of Copenhagen, Denmark (ZMUC).

Parts that were dissected from specimens (mouthparts, antennae, legs, abdomen and genitalia) were stored in microvials with glycerin. The microvials were pinned together with the respective specimen. Photographs were taken using a Sony Cyber-shot (DSC-W300) digital camera coupled to a Zeiss Stemi SV6 compound stereomicroscope and a Zeiss Stereo Discovery Standard 20 microscope.

The terminology used in the descriptions follows Costa et al. (2008) and Krüger et al. (2016).

The labels of the type material are arranged in sequence from top to bottom, with the data for each label within double quotes (" "); slashes (/) separate the rows, and the information between brackets ([]) provides additional details recorded on the labels.

TAXONOMY

Coeliaria Mulsant, 1850

Figs 1–12

Coeliaria Mulsant, 1850: 1042 (description); Crotch 1874: 283 (description); Chapuis 1876: 242 (description); Gemminger and Harold 1876: 3801 (catalog); Korschefsky 1932: 229 (catalog); Blackwelder 1945: 451 (checklist); Gordon 1987: 34 (catalog); Fürsch 1990a: 4 (catalog); Fürsch 1990b: 9 (catalog); Gordon 1994: 683 (taxonomy); Fürsch 2007: 1 (catalog); Costa et al. 2008: 366 (citation); González 2013: 64 (distribution).

Type species. *Exoplectra erythrogaster* Mulsant, 1850 (original designation).

Diagnosis. *Coeliaria* is a Neotropical genus that resembles *Exoplectra* Mulsant, 1850, and *Gordonita* González, 2013, by the angulation of the tibia. *Coeliaria* is distinguished from *Exoplectra* by the presence of a fovea in the hypomera; pronotum with the inner angles more prominent and emarginated. In *Gordonita*, the fovea of the hypomera is small and deep; the body is elongated and depressed. *Coeliaria* is distinguished from the other genera of Chnoodini by the following combination of characters: Body black or dark, without spots; dorsal surface pubescent; antenna 11-segmented; labrum truncated; hypomera with rounded

fovea; tibia flat and angulated; abdomen with five visible sternites (females) or six sternites (males); abdominal postcoxal line incomplete, recurved, oblique line present.

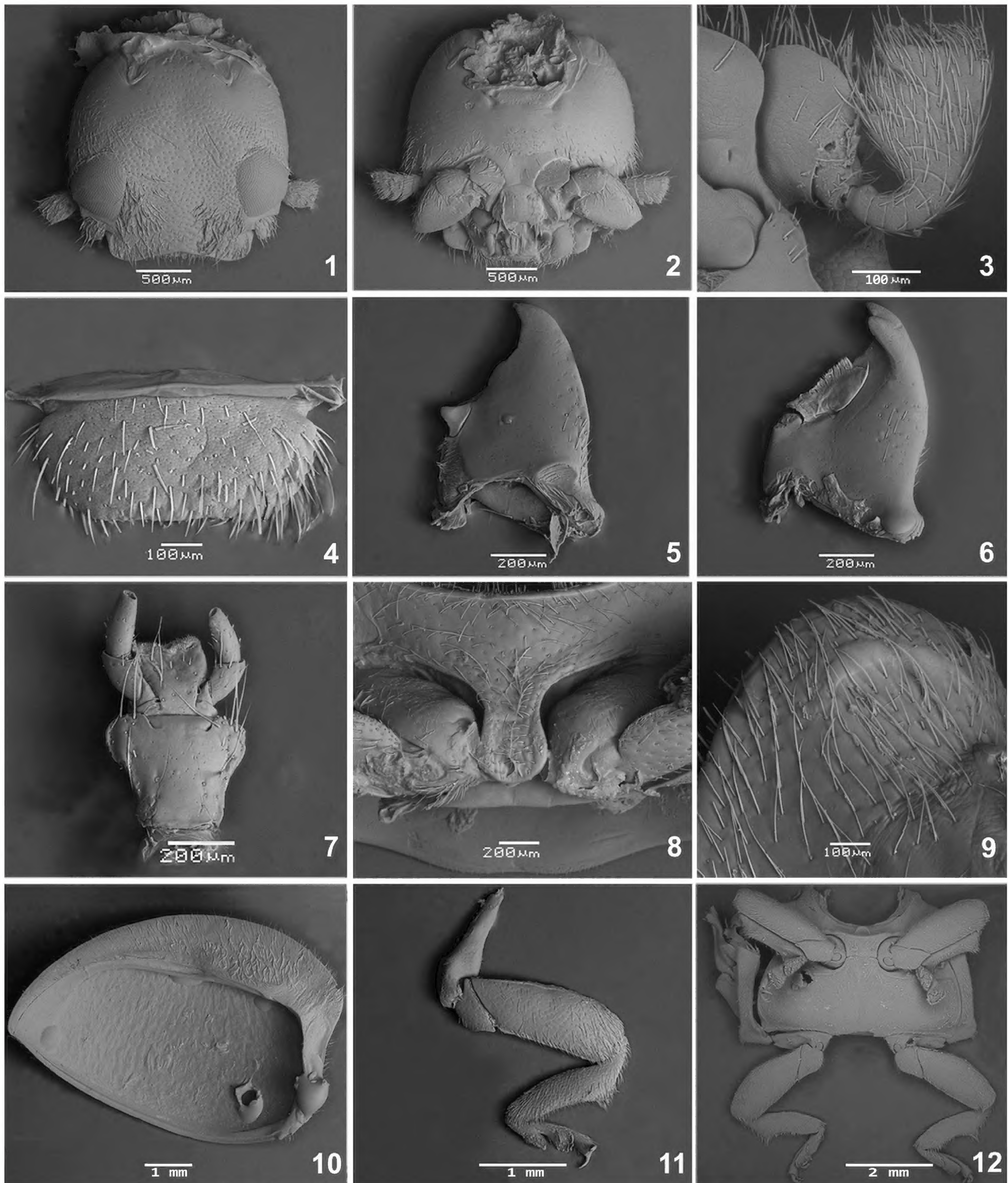
Redescription. Body rounded or oval, convex, with yellowish or whitish pubescence, fine and dense, with punctation fine and sparse. Integument brownish or black, with green, bluish, or bronze metallic reflections, without spots. Ventral surface reddish, brown, or black. Head black or brownish; clypeus merged with forehead, without fronto-clypeal suture, expanded laterally and with rounded front edge, distinctly emarginated; eyes divided by the gena (Figs 1, 2) partially covered by the pronotum. Antennae 11-segmented with conspicuous club (Fig. 3). Labrum transverse, truncate anteriorly (Fig. 4); mandibles asymmetric, robust with apex bifid (Figs 5, 6); maxillae with last segment of palpus distinctly securiform; labium with short bristles on ligule (Fig. 7). Pronotum transverse, narrower than elytra, anterior border emarginated with lateral margin straight, rounded above and subsinuous posteriorly. Hypomera with large, deep and rounded fovea (Fig. 9). Prosternal process with rounded apex, without carina (Fig. 8). Elytra expanded with projected humeral callus, with anterior margin truncate; elytral epipleuron wide, deeply excavated for reception of femoral apex, with carina parallel in the inner margin, curved at base (Fig. 10). Legs with relatively wide femora, excavated for reception of tibiae; tibiae flattened, with acute angulation on outer margin (Figs 11, 12); claws bifid. Abdomen with five (females) or six (males) visible ventrites, with descending post-coxal line, attached to the posterior edge of the first ventrite, with oblique line.

Male genitalia. Tegmen with penis guide and symmetrical parameres; penis slender, with developed penis capsule.

Female genitalia. Coxites elongated and sub-triangular; spermatheca C-shaped, simple.

Key to the species of *Coeliaria* Mulsant, 1850

1. Body black or dark brown, with reflections of different colors 2
- 1'. Body black, without reflections, elytra very expanded, 5.67 to 10.0 mm (Figs 13–16) *C. erythrogaster* Mulsant, 1850
2. Body longer than wide, black, with bronze or blue reflections, 3.08 to 4.0 mm (Figs 38–41) *C. luteicornis* (Mulsant, 1850), comb. nov.
- 2'. Body as long as wide, black or brown, with reflections of other colors 3
3. Bluish reflections, body 3.0 to 4.0 mm *C. bernardinensis* (Brèthes, 1925), comb. nov.
- 3'. Brown reflections, body 5.0 mm (Figs 47–50) *C. castanea* sp. nov.



Figures 1–12. Scanning electron microscopy of *Coeliaria erythrogaster*: (1) head, dorsal view, (2) head, ventral view; (3) antenna, lateral view; (4) labrum; (5) mandibles, dorsal view, (6) mandibles, ventral view; (7) labium; (8) prosternal process; (9) hypomera; (10) elytra, ventral view; (11) leg, dorsal view; (12) metathorax, ventral view.

Coeliaria erythrogaster Mulsant, 1850

Figs 13–28, 55

Coeliaria erythrogaster Mulsant, 1850: 1042 (description); Crotch 1874: 283 (description); Gemminger and Harold 1876: 3801 (catalog); Karsch 1932: 229 (catalog); Blackwelder 1945: 451 (checklist); Gordon 1987: 34 (catalog); Fürsch 1990b: 9 (systematic); Costa et al. 2008: 367 (revision, Brazilian species). *Exoplectra erythrogaster* Mulsant, 1850: 916 (original description); Mariconi and Zamith 1959: 261 (biology); Mariconi and Zamith 1960: 229 (biology).

Redescription. Male. Length 5.67–10.00 mm, width 5.42–9.17 mm. Body hemispherical, rounded and convex, with fine pubescence, short, thick, whitish or yellowish, with thin, sparse punctuation; integument black and dark brown (Figs 13–16, 24–26). Head dark, antennae and mouthparts reddish (Fig. 14). Pronotum transverse, narrower than elytra, with anterior margin emarginate, lateral margin straight, rounded anteriorly, and posterior margin subsinuuous (Fig. 15), hypomera with deep, rounded fovea. Prosternal process with rounded apex, without carina, longer than wide, strangulated at base (Fig. 8). Scutellum black. Elytra dark, without spots and strongly expanded (Figs 15, 25); epipleurae wide, narrowing towards apex, fovea shallow for reception of femoral apex (Figs 10, 14). Meso- and metaventrite black. Legs black, with flattened femora and tibiae, with acute angulation on outer margin (Figs 11, 14). Abdomen with incomplete post-coxal line, attached to posterior margin of first ventrite, with oblique line (Figs 17, 27). Genitalia symmetrical; tegmen with penis guide symmetrical, broad at base, narrowing at apex; parameres slightly wide, with short bristles, slightly larger than penis guide (Figs 18, 19). Penis sclerotized, J-shaped, with rounded apex, penis capsule with highly developed inner arm (Fig. 20).

Female. Similar to the male. Coxites longer than wide, sub-triangular, with long bristles; mammiliform style (Fig. 22). Spermatheca C-shaped, with acute apex (Fig. 21).

Type material. It was only possible to examine photographs of the syntype (Figs 24–28) deposited in the Musée des Confluences, Lyon, France (MHNL). In 1970, R.D. Gordon indicated, on a label, that the specimen as the Lectotype, but this designation was not published. Here we designate this specimen as the Lectotype.

Material examined. Bolivia. *Santa Cruz*: Roboré, 28-II to 1-III-1954, C. Gans-F. Pereira leg., 1 specimen (DZUP 188194). Brazil. *Goiás*: Faz. Cachoeirinha, Jatai, X. 1962, Exp. Dep. Zool., 1 specimen (MZSP); *Minas Gerais*: Faz dos Campos, XII-1920, Col. J.F. Zikán, 1 specimen (DZUP 146675); *Espírito Santo*: Sta. Teresa, 12-X-64, C. Elias leg., 1 specimen (DZUP 185643); 19-X-64, C. Elias leg., 2 specimens (DZUP 188181, 185641); 26-X-64, C. Elias leg., 1 specimen (DZUP 185642); *São Paulo*: Marília, 1.XI.945, Coll. H. Zellibor, 2 specimens (MNRJ); *São Paulo*, Mus. Pragense, Karsch Collection 1952, 1 specimen (USNM); (Jabaquara), 10.XII. 45, Coll. H. Zellibor, 1 specimen (MNRJ); *Rio de Janeiro*: Itatiaia, I-1929, Coll. J.F. Zikán, 1 specimen (DZUP 185612); (Corcovado), VII. 1958, Alvarenga and Seabra, Coll. M. Alvarenga, 1 male (DZUP 188193);

18-IX-61, J.S. Moure, Alvarenga and Seabra, 1 male (DZUP 288378); X-1961, Seabra and Alvarenga leg., 2 specimens (DZUP 185644, 185645); 8.X.1962, Alvarenga and Seabra, Coll. M. Alvarenga, 1 female (DZUP 288374); XI.1962, Alvarenga and Seabra, Coll. M. Alvarenga, 1 specimen (DZUP 188192); X.1966, Alvarenga and Seabra, Coll. M. Alvarenga, 1 specimen (DZUP 288373); XI.1967, Alvarenga and Seabra, Coll. M. Alvarenga, 1 specimen (DZUP 288375); 30.X.1975, M.A. Monné, 1 specimen (MNRJ); 1.X.1976 M.A. Monné, 1 specimen (MNRJ); 7.X.1976 M.A. Monné, 1 specimen (MNRJ); XI.1955, Alvarenga and Seabra, 1 female (MNRJ); X.1958, Alvarenga and Seabra, 1 specimen (MNRJ); XI.1958/Alvarenga and Seabra", 3 specimens (MNRJ); XII.1958, Alvarenga and Seabra, 1 female (DZUP 288376); Nova Friburgo, IV.2005, E.J. Grossi col., 1 specimen (DZUP 132000); *Paraná*: Arapongas, XII.1951, A. Maller, 1 female (DZUP 185640); *Santa Catarina*: Seara (Nova Teutônia), 27°11'8", 52°23'1", Fritz Plaumann, 1.X.1949, 1 specimen (FPNT); XI.1953, 1 specimen (FPNT); Corupá, Hansa Humbolt, Oct. 1944, 1 specimen (CAS); 2-I-38, 1 specimen (DZUP 188185); Mus. Westerm., 1 specimen (ZMUC).

Geographical distribution. Bolivia, Brazil and Paraguay (Fig. 55).

Remarks. *Coeliaria erythrogaster*, first described in *Exoplectra*, was characterized by presenting a fovea in the hypomera, differentiating it from all other species of *Exoplectra*. Since then it was considered the only species of *Coeliaria*. In addition to this character, *C. erythrogaster* has strongly expanded elytra, pubescence very dense and uniform, and is larger than the other species of the genus.

Biological data. Costa Lima (1950) published a report of the metamorphosis of *C. erythrogaster* larvae, and mentioned that it was covered by abundant waxy secretions. Mariconi and Zamith (1959, 1960) described the larvae and adult, as well as biological aspects of *E. erythrogaster* preying on *Mimosicerya hemmeli* (Cockerell, 1899) (Hemiptera: Margarodidae) on the plant *Cassia fistula* Linnaeus (Fabaceae) in Piracicaba, São Paulo, Brazil. In their description of the adult they mentioned various bare areas, apparently with shorter and thinner pubescence. This description is consistent with Crotch (1874), who mentioned that recently collected specimens have gray pubescence, giving the impression of bare spots, which is very peculiar. According to those authors, the larvae are completely covered by white secretions that form a mass of conspicuous flaky wax, which extends 30 to 35 mm in length.

Coeliaria bernardinensis (Brèthes, 1925), comb. nov.

Figs 29–37, 55

Exoplectra bernardinensis Brèthes, 1925: 8 (original description); Karsch 1932: 227 (catalog); Denier 1939: 581 (list); Blackwelder 1945: 450 (checklist); Costa et al. 2008: 365 (revision, Brazilian species).

Redescription. Male. Length 3.08–4.00 mm, width 2.58–3.83 mm. Body rounded, with fine pubescence, thick,



Figures 13–23. *Coeliaria erythrogaster*: (13) dorsal view, (14) ventral view, (15) frontal view, (16) lateral view, (17) abdomen. Male genitalia: tegmen (18) dorsal view, (19) lateral view; (20) penis; female genitalia (21) spermatheca, (22) coxites. (23) Antenna.



Figures 24–28. *Coeliaria erythrogaster*, type material from Musée des Confluences, Lyon, France (MNHL): (24) dorsal view, (25) frontal view, (26) lateral view, (27) abdomen, (28) labels.



Figures 29–37. *Coeliaria bernardinensis* comb. nov.: (29) dorsal view, (30) ventral view, (31) frontal view, (32) lateral view, (33) abdomen. Male genitalia: tegmen (34) dorsal view, (35) lateral view; (36) penis; (37) female genitalia (coxites and spermatheca).

whitish, with thin, sparse punctuation; integument black with blue or green metallic reflections (Figs 29–32). Head, antennae and mouthparts dark or reddish (Fig. 30). Pronotum transverse, narrower than elytra, with emarginated anterior margin, straight lateral margin, rounded anteriorly, and subsinuous posterior margin (Fig. 31), hypomera with deep fovea. Prosternal process with sub-quadrangular apex, without carina, as wide as long. Scutellum black. Elytra dark without spots (Figs 29, 32); epipleura narrowing towards apex, with fovea for reception of femoral apex (Fig. 30). Meso- and metaventrite black. Legs black, with flattened femora and tibiae with acute angulation at the outer margin. Abdomen with central region of first ventrite blackish, others lighter, with oblique line (Fig. 33). Genitalia symmetrical: tegmen with symmetrical penis guide, wide at base and narrow at apex, which is slightly recurved; parameres with long bristles slightly larger than penis guide (Figs 34, 35). Penis sclerotized, with acuminate and recurved apex, developed penis capsule (Fig. 36).

Female. Similar to male. Coxites elongated, longer than wide, sub-triangular with long bristles (Fig. 37). Spermatheca more or less recurved, C-shaped, with undeveloped ramus (Fig. 37).

Type material. According to Gordon (1987) the holotype would be found in British Museum of Natural History, London, England. However, Horn and Kahle (1935–1937) indicated that the type material was deposited in the Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (MACN), Buenos Aires, Argentina, but it was not possible to study this material, because MACN does not lend material for study.

Material examined. Brazil. *Alagoas*: Maceió, VI. 1993, Lima, I.M.M., 1 female (DZUP 131993); *Goiás*: Dianópolis, 11–14.I.1962, J. Bechyné col., 1 specimen (DZUP 192029); *Corumbá de Goiás*, 5. II.1962, J. Bechyné col., 1 specimen (DZUP 192042); *Jatáí*, Cerrado, Faz. Nova Orlandia, I. 964, Martins, Morgante and Silva, 1 specimen (DZUP 192033); *Minas Gerais*: Belo Horizonte (Campus-UFMG) 17.VI.81, C13, N. S. Domingos, 1 male (DZUP 192032); 07.V.81, B17, N.S. Domingos, 1 specimen (DZUP 192037); 06.XII.82, B17, N.S. Domingos, 1 male (DZUP 192030); *Espírito Santo*: Conceição da Barra (BR 16), 21/IX/68, C. and C.T. Elias leg., 1 specimen (DZUP 192036); *Guarapari*, IX-1960, M. Alvarenga leg., 1 specimen (DZUP 192043); IX-1960, M. Alvarenga leg., 1 male (DZUP 192045); IX-1960, M. Alvarenga leg., 1 male (DZUP 192025); IX-1960, M. Alvarenga leg., 1 specimen (DZUP 192040); IX-1960, M. Alvarenga leg., 1 specimen (DZUP 192035); XI-61, M. Alvarenga, 1 specimen (DZUP 192044); XI-61, M. Alvarenga, 1 male (DZUP 192034); XI-61, M. Alvarenga, 1 specimen (DZUP 192038); XI-61, M. Alvarenga, 1 specimen (DZUP 192039); *Mato Grosso*: Chapada dos Guimarães, 20-I-1961, MT/J. and B. Bechyné, 1 specimen (DZUP 187185); 23-I-1961, MT/J. and B. Bechyné, 1 specimen (DZUP 146701).

Geographical distribution. Brazil and Paraguay (Fig. 55).

Remarks. *Coeliaria bernardinensis* was first described as *Exoplectra bernardinensis*, but is herein transferred to *Coeliaria*

based on the presence of a deep fovea in the hypomera, which characterizes *Coeliaria*. It differs from the other species of *Coeliaria* by its small size and pattern of genitalia.

Coeliaria luteicornis (Mulsant, 1850), comb. nov.

Figs 38–46, 55

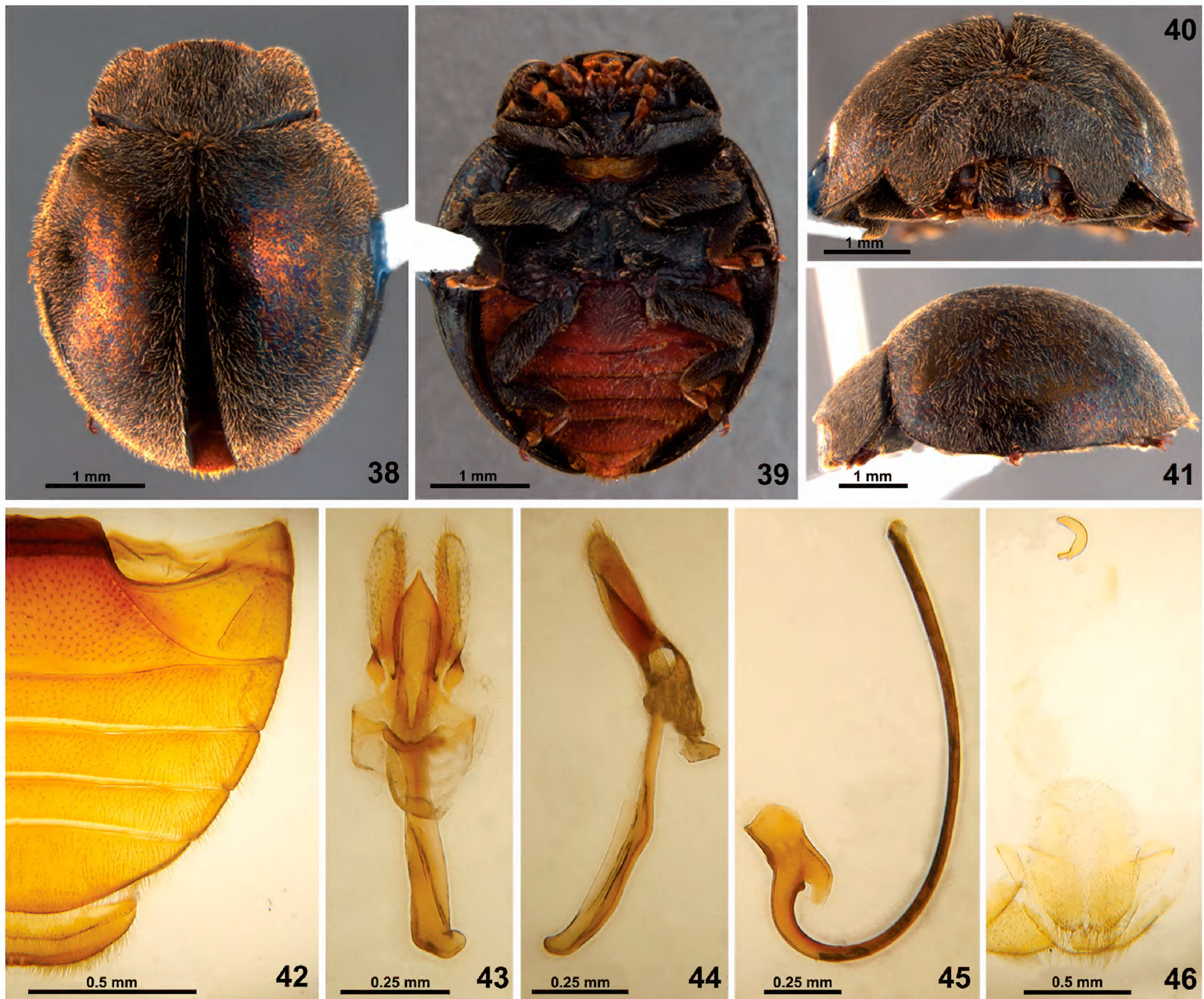
Exoplectra luteicornis Mulsant, 1850: 919 (original description); Crotch 1874: 284 (synonymy); Korschefsky 1932: 227 (catalog); Blackwelder 1945: 450 (checklist); Costa et al. 2008: 365, 373, 374 (revision, Brazilian species).

Redescription. Male. Length 5.50–6.25 mm, width 4.42–5.25 mm. Body ovate, with fine, short, thick, whitish or yellowish pubescence; with thin, sparse punctuation; integument black with blue metallic reflections (Figs 38–41). Head, antennae and mouthparts dark, reddish (Fig. 39). Pronotum transverse, narrower than elytra, with emarginated anterior margin, straight lateral margin, rounded anteriorly, and with posterior margin subsinuous (Fig. 40), hypomera with rounded fovea (Fig. 39). Prosternal process sub-quadrangular, apex without carina (Fig. 39). Scutellum black. Elytra dark, without spots (Figs 38–41); epipleura wide, narrowing towards apex, with slight fovea for reception of femoral apex (Fig. 39). Meso- and metaventrite black. Legs black with flattened femora, and tibiae with acute angulation at the outer margin (Fig. 39). Abdomen reddish, with oblique line (Figs 39, 41). Genitalia symmetrical; tegmen with penis guide wide at base and narrowing at apex; parameres wide, with short bristles, slightly larger than penis guide (Figs 43, 44). Penis sclerotized, J-shaped, with rounded apex, developed penis capsule (Fig. 45).

Female. Similar to male. Coxites sub-triangular, with long bristles; spermatheca C-shaped with highly developed ramus (Fig. 46).

Type material. It was not possible to study the type material, which, according to Gordon (1987) is deposited in the Muséum National d'Histoire Naturelle, Paris, France. We were not able to locate this specimen there.

Material examined. Brazil. *São Paulo*: Mairiporã, 4–13. I. 1967, C. Costa col., 1 specimen (DZUP 188384); *Paraná*: P. Grossa, Pedreira, Coleção F. Justus Jor, 2 specimens (DZUP 192084, 288380); *Santa Catarina*: Seara (Nova Teutônia), XI.1951, F. Plaumann col., 1 female (DZUP 192101); XI.1951, F. Plaumann col., 4 specimens (DZUP 192055, 192066, 192082, 192083); X.1965, F. Plaumann col., 1 specimen (DZUP 192100); XI.1965, F. Plaumann col., 8 specimens (DZUP 192077–192078, 192080–192081, 192085–192086–192087, 192099); I.1966, F. Plaumann col., 2 specimens (DZUP 192053, 192065); XI.1966, F. Plaumann col., 6 specimens (DZUP 192052, 192059–192060–192061, 192064, 192079); 27°11'B. 52°23'L, Fritz Plaumann, I.1974, 6 specimens (DZUP 192057, 288382–288383, 192058, 288385–288386); V.1974, 2 specimens (DZUP 192046, 192026); X.1974, 1 female (DZUP 192056); X.1974, 2 specimens (DZUP 192047, 288387); X.1974, 4 specimens (DZUP 192048, 192051,



Figures 38–46. *Coeliaria luteicornis* comb. nov.: (38) dorsal view, (39) ventral view, (40) frontal view, (41) lateral view, (42) abdomen. Male genitalia: tegmen (43) dorsal view, (44) lateral view; (45) penis; (46) female genitalia (coxites and spermatheca).

288384,192049); XI.1974, 5 specimens (DZUP 192050,192062, 288381, 192063, 288388); Nov 74, 1 specimen (DZUP 192028); XII.1974, 1 specimen (DZUP 192054); Fritz Plaumann, 1 female (DZUP 192027); *Rio Grande do Sul*: Derrubadas, 27.X. 2003, I. Heydrich col., 1 specimen (MCN 228613); 28.X. 2003, I. Heydrich col., 1 specimen (MCN 227521); 30.X.2003, A. Barcellos col., 27°14'14.7"S, 53°58'46.0"W, 1 specimen (MCN 227530); 31.X.2003, L. Moura col., 1 specimen (MCN 227520); 20.X. 2004, A. Barcellos col., 1 specimen (MCN 231547); 20.X.2004, L. Moura col., 1 specimen (MCN 231575); 21.X. 2004, L. Moura col., 5 specimens (MCN 231544, 231593, 231581, 231592, 231589); 21.X. 2004, R. Ott col., 2 specimens (MCN 231566, 231596); 21.X. 2004, L. Podgaiski col., 1 specimen

(MCN 231556); 22.X. 2004, I. Heydrich col., 2 specimens (MCN 231582, 230461); 22. X. 2004, R. Ott col., 1 specimen (MCN 231579); 22.X. 2004, A. Barcellos col., 2 specimens (MCN 230462, 230463); 22.X. 2004, L. Moura col., 1 specimen (MCN 231610); 22.X. 2004, L. Podgaiski col., 1 specimen (MCN 230479).

Geographical distribution. Brazil (Fig. 55).

Remarks. *Coeliaria luteicornis* shows a deep fovea in the hypomera, characteristic of *Coeliaria*; additionally, it has an oval body with whitish or yellowish pubescence. The male genitalia is similar to that of *C. erythrogaster*, but the female differs in the shape of the spermatheca. The most distinctive characteristic of this species is its oval body.



Figures 47–54. *Coeliaria castanea* sp. nov.: (47) dorsal view, (48) ventral view, (49) frontal view, (50) lateral view, (51) abdomen. Female genitalia (52) coxites, (53) spermatheca; (54) labels.

Coeliaria castanea sp. nov.

<http://zoobank.org/BC6551EB-703D-4B3E-82AA-B8A2177A6729>
Figs 47–54, 55

Description. Holotype female. Length 5.58 mm, width 5.25 mm. Body rounded, integument light brown, white pubescence (Fig. 47–50). Pronotum transverse, narrower than elytra, anterior margin emarginated yellowish, lateral margin rounded, posterior margin subsinuous (Fig. 49), hypomera with rounded fovea (Fig. 48). Prosternal process sub-quadrangular, apex without carinae, as long as wide (Fig. 48). Ventral color lighter than dorsal (Fig. 48). Scutellum brown. Elytra brownish, without spots (Figs 47–50); epipleura wide, narrowing to apex, with fovea for reception of femoral apex. Meso- and metaventre brownish (Fig. 48). Legs brownish, flattened femora and tibiae, with acute angulation at the outer margin. Abdomen yellowish, with oblique line (Fig. 51).

Genitalia symmetrical; coxites very elongated, three times longer than wide, styles with long bristles (Fig. 52). Spermatheca C-shaped, with sclerotized infundibulum (Fig. 53).

Male. Unknown.

Material examined. The holotype female is labeled as follows: Brazil, *Santa Catarina* “Nova Teutônia/SC, Brasil/XI. 1966/F. Plaumann col.”, “♀”, “HOLOTIPO/*Coeliaria castanea*” Churata-Salcedo & Almeida [red label], 1 specimen “DZUP/186709” [DZUP] (Fig. 54). The holotype is double mounted, and is in good condition (genitalia on microvial with glycerin).

Etymology. The species epithet, *castanea*, is a reference to the color pattern of this species.

Geographical distribution. Brazil (Santa Catarina) (Fig. 55).

Remarks. *Coeliaria castanea* sp. nov. resembles *C. erythrogaster* by having very conspicuous, deep and rounded fovea, but differs in the brownish color and by the shape of the female genitalia.

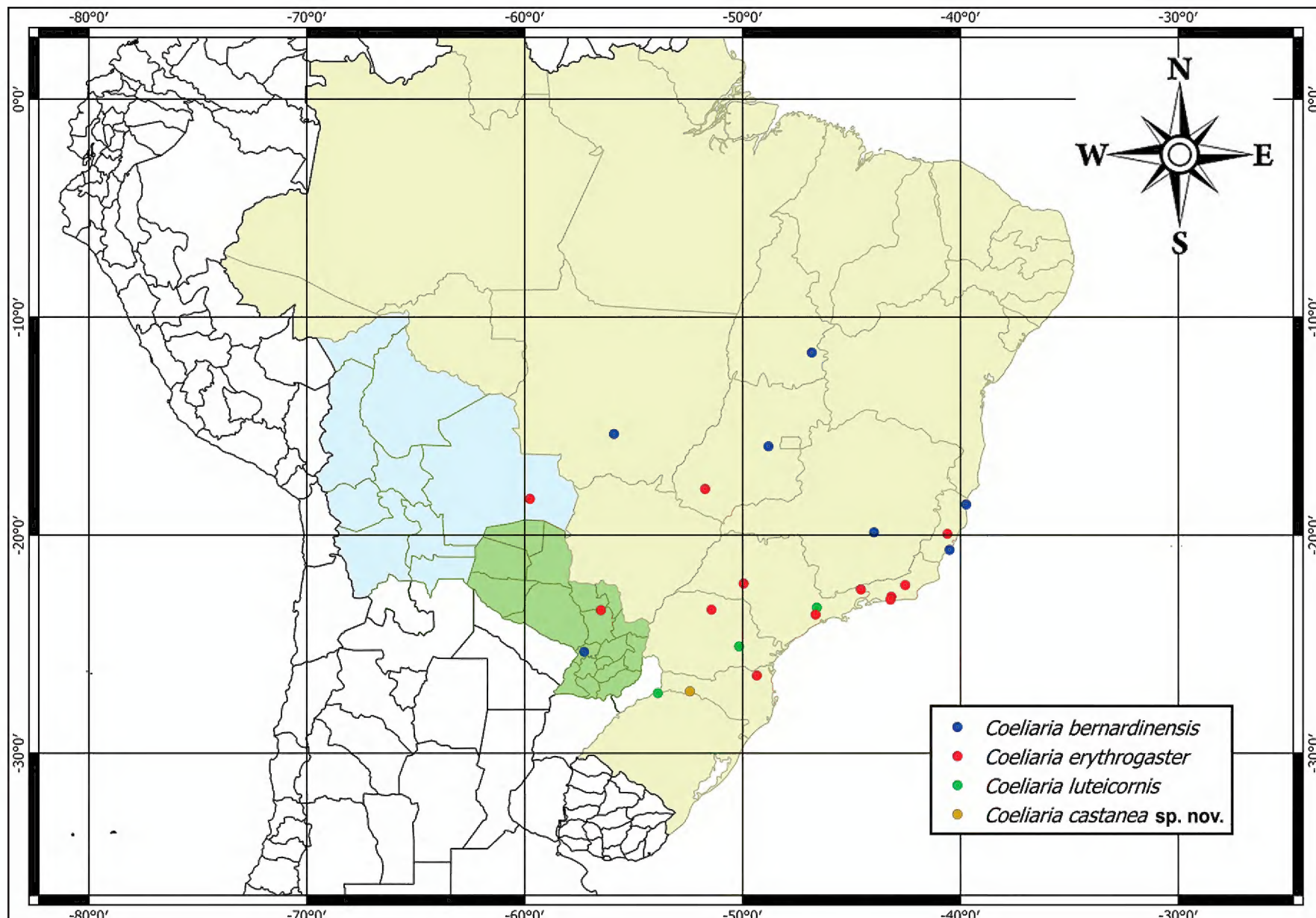


Figure 55. Map showing the known geographical distribution of the species of *Coeliaria*.

ACKNOWLEDGMENTS

We thank Coordenação de Aperfeiçoamento de Pessoal de Nível Superior for the Master's fellowship to JMCS (CAPES 1347909/2014), Conselho Nacional de Desenvolvimento Científico e Tecnológico for the research fellowship to LMA (CNPq 309764/2013-0), the Centro de Microscopia Eletrônica (UFPR) and Roy Funch who helped with the English of the previous version of this manuscript.

LITERATURE CITED

- Blackwelder RE (1945) Checklist of the Coleopterous insects of Mexico, Central America, the West Indies, and South America. Bulletin of the United States National Museum 185: 1–188. <https://doi.org/10.5479/si.03629236.185.3>
- Bouchard P, Bousquet Y, Davies AE, Alonso-Zarazaga MA, Lawrence JF, Lyal CHC, Newton AF, Reid CAM, Schmitt M, Ślipiński A, Smith ABT (2011) Family-group names in Coleoptera (Insecta). ZooKeys 88: 1–972. <https://doi.org/10.3897/zookeys.88.807>
- Brèthes J (1925) Coccinellides du British Museum. Nunquam Otiosus IV, 1–10.
- Casey TD (1899) A revision of the American Coccinellidae. Appendix II: on South American Coccinellidae. Journal of the New York Entomological Society 7: 168–169.
- Chapuis F (1876) Famille des phytophages des érotyliens des endomychides et des coccinellides. Tomo 12. In: Lacordaire Jt, Chapuis F (Eds) Histoire naturelle des insectes. Genera des Coléoptères. Roret, Paris, 424 pp.
- Chevrolat LA (1844) *Exoplectra*. In: d'Orbigny CD (Ed.) Dictionnaire Universel d'Histoire Naturelle. L. Houssiaux, Paris [1861], vol. 5, 545 pp.
- Chevrolat LA (1849) *Chnoodes*. In: d'Orbigny CD (Ed.) Dictionnaire Universel d'Histoire Naturelle. L. Houssiaux, Paris [1861], vol. 3, 612 pp.
- Costa Lima A (1950) Nota sobre a larva de uma joaninha (Coleoptera, Coccinellidae). Revista de Entomologia 21: 592–593.
- Costa AV, Almeida LM, Corrêa GH (2008) Revisão das espécies brasileiras do gênero *Exoplectra* Chevrolat (Coleoptera, Coccinellidae, Exoplectrinae, Exoplectrini). Revista Brasileira de Entomologia 52: 365–383. <https://doi.org/10.1590/S0085-56262008000300010>
- Crotch GR (1874) A revision of the Coleopterous Family Coccinellidae. E.W. Janson, London, 311 pp. <https://doi.org/10.5962/bhl.title.8975>

- Denier CL (1939) De Coccinellidis Brethesianis. Typorum Speciarum Recensio. Physis 17: 569–587.
- Fürsch H (1990a) Taxonomy of Coccinellids. Coccinella 2: 4–6.
- Fürsch H (1990b) Valid genera and subgenera of Coccinellidae. Coccinella 2: 7–18.
- Fürsch H (2007) Taxonomy of Coccinellids. Coccinella 6: 1–3.
- Gemminger M, Harold B (1876) Chrysomelidae (Par II.), Langu-ridae, Erotylidae, Endomychidae, Coccinellidae, Corylophidae, Platypsyllidae. Família LXXII: Coccinellidae, Tom. 12. In: Gemminger M, Harold B (Eds) Catalogus Coleopterorum hucusque descriptorum synonymicus et systematicus, 3740–3818.
- González G (2013) *Gordonita* n. gen. y otros aportes al conocimiento de los Chnoodini de América del Sur (Coleoptera: Coccinellidae). Boletín de la Sociedad Entomológica Aragonesa 53: 63–79.
- Gordon RD (1987) A catalogue of the Crotch collection of Coccinellidae (Coleoptera). Occasional Papers on Systematic Entomology 3: 1–46.
- Gordon RD (1994) South American Coccinellidae (Coleoptera). Part III: Definition of Exoplectrinae Crotch, Azyinae Mulsant, and Coccidulinae Crotch; a taxonomic revision of Coccidulini. Revista Brasileira de Entomologia 38: 681–775.
- Hodek I, Honěk A (1996) Ecology of Coccinellidae. Kluwer Academic Publishers, Dordrecht, 464 pp. <https://doi.org/10.1007/978-94-017-1349-8>
- Horn W, Kahle I (1935–1937) Über entomologische Sammlungen, Entomologen & Entomo-Museologie. Berlin, Dahlem, 533 pp.
- Korschefsky R (1931) Coccinellidae II. In: Junk W, Schenkling S (Eds) Coleopterorum Catalogus. W. Junk, Berlin, Pars 118, 1–224.
- Korschefsky R (1932) Coccinellidae II. In: Junk W, Schenkling S (Eds) Coleopterorum Catalogus. W. Junk, Berlin, Pars 120: 225–659.
- Krüger TC, Castro-Guedes CF, Almeida LM (2016) Two new species of *Chnoodes* Chevrolat (Coleoptera: Coccinellidae) from Brazil. Zootaxa 4078: 269–283. <https://doi.org/10.11646/zootaxa.4078.1.24>
- Latreille PA (1807) Genera Crustaceorum et Insectorum Secundum Ordinem Naturalem in Familias Disposita, Iconibus Exemplisque Plurimus Explicata. Paris, vol. 3, 258 pp.
- Mariconi FAM, Zamith APL (1959) Notas sobre uma cochonilha e seu predador. O Biológico 25: 258–265.
- Mariconi FAM, Zamith APL (1960) Contribuição para o conhecimento da *Mimosicerya hempeli* (Cockerell, 1899) (Homoptera, Margarodidae) e de seu predador *Exoplectra erythrogaster* Mulsant, 1851 (Coleoptera, Coccinellidae). Anais da Escola Superior de Agricultura “Luiz de Queiroz”, 223–238.
- Mulsant E (1846) Histoire Naturelle des Coléoptères de France. Sulcicolles, sécuripalpes. Paris, [From Horn.], 280p.
- Mulsant E (1850) Species des Coléoptères trimères sécuripalpes. Annales des Sciences Physique et Naturelles d’Agriculture et d’Industrie, Lyon, 1104 pp. <https://doi.org/10.5962/bhl.title.8953>
- Nedvěd O, Kovář I (2012) Phylogeny and classification. In: Hodek I, Emdem HF, Honěk A (Eds) Ecology and Behaviour of the Ladybird Beetles. Wiley, Blackwell, Oxford, 1–12. <https://doi.org/10.1002/9781118223208.ch1>
- Seago A, Giorgi J, Li J, Ślipiński A (2011) Phylogeny, classification and evolution of ladybird beetles (Coleoptera: Coccinellidae) based on simultaneous analysis of molecular and morphological data. Molecular Phylogenetics and Evolution 60: 137–151. <https://doi.org/10.1016/j.ympev.2011.03.015>
- Sicard A (1907) Revision des Coccinellides de la Faune Malgache (I). Annales de la Société Entomologique de France 76: 425–482.
- Sicard A (1909) Revision des Coccinellides de la Faune Malgache. Annales de la Société Entomologique de France 78: 63–165.
- Weise J (1895) Neue Coccinelliden, sowie Bemerkungen zu bekannten Arten. Annales de la Société Entomologique de Belgique 39: 120–146.

 Submitted: 29 July 2016

Received in revised form: 8 December 2016

Accepted: 22 December 2016

Editorial responsibility: Alessandra Rung

Author Contributions: JMCS and LMA participated equally in the preparation of this article.

Competing Interests: The authors have declared that no competing interests exist.